CITY OF ASPEN

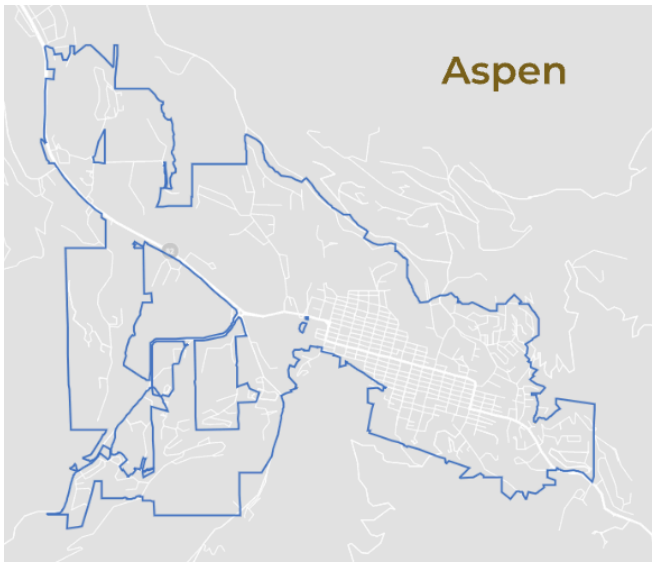
# 2023 City of Aspen Community-wide Greenhouse Gas Emissions Summary

This report is drawn from a comprehensive inventory of 2023 greenhouse gas (GHG) emissions data for the Pitkin County Region and focuses on the subset of data for the City of Aspen. It serves as an update to the previous (2022) report, which established a preliminary baseline for emissions using data from 2019-20.

Aspen and Pitkin County have long recognized the need to do their part to reduce emissions. The regional economy and the lifestyle and natural resources that support the community stand to be highly impacted by climate change. Moreover, while addressing the climate crisis requires action on a global scale, Aspen has the power to lead by example. By implementing ambitious local climate policies and emission reductions, the City can inspire regional, national, and international planning efforts.

## Geographic scope

The boundaries discussed in this summary include only the City of Aspen's legal boundaries in order to comply with the GPC protocol and to avoid double-counting areas located in unincorporated parts of the County. Inventories prior to 2019 counted a larger area in attempts to account for local tourism and economic activities such as the emissions impacts from skiing.




## Methodology

This report generally employs the same process of analysis as the previous one performed for 2019 and 2020. Following the Global Protocol for Community-Scale Greenhouse Gas Emissions Inventories (GPC), it accounts for direct and indirect emissions (see sidebar on next page) produced by community members and visitors. It draws from the best available data sources (allowing for estimates where necessary) and utilizes emission factors from reputable sources such as the Environmental Protection Agency, the State of Colorado, and local utilities.

In this year's analysis and report, some updates have been made to the methodology to improve accuracy. Notably, in calculating transportation emissions, vehicle miles traveled (VMT) are now estimated using a more comprehensive look at trips starting and/or ending within municipal boundaries. Additionally, aviation emissions are calculated using data from the Aspen/Pitkin County Airport inventory and allocated to Aspen in proportion to its share of the population.

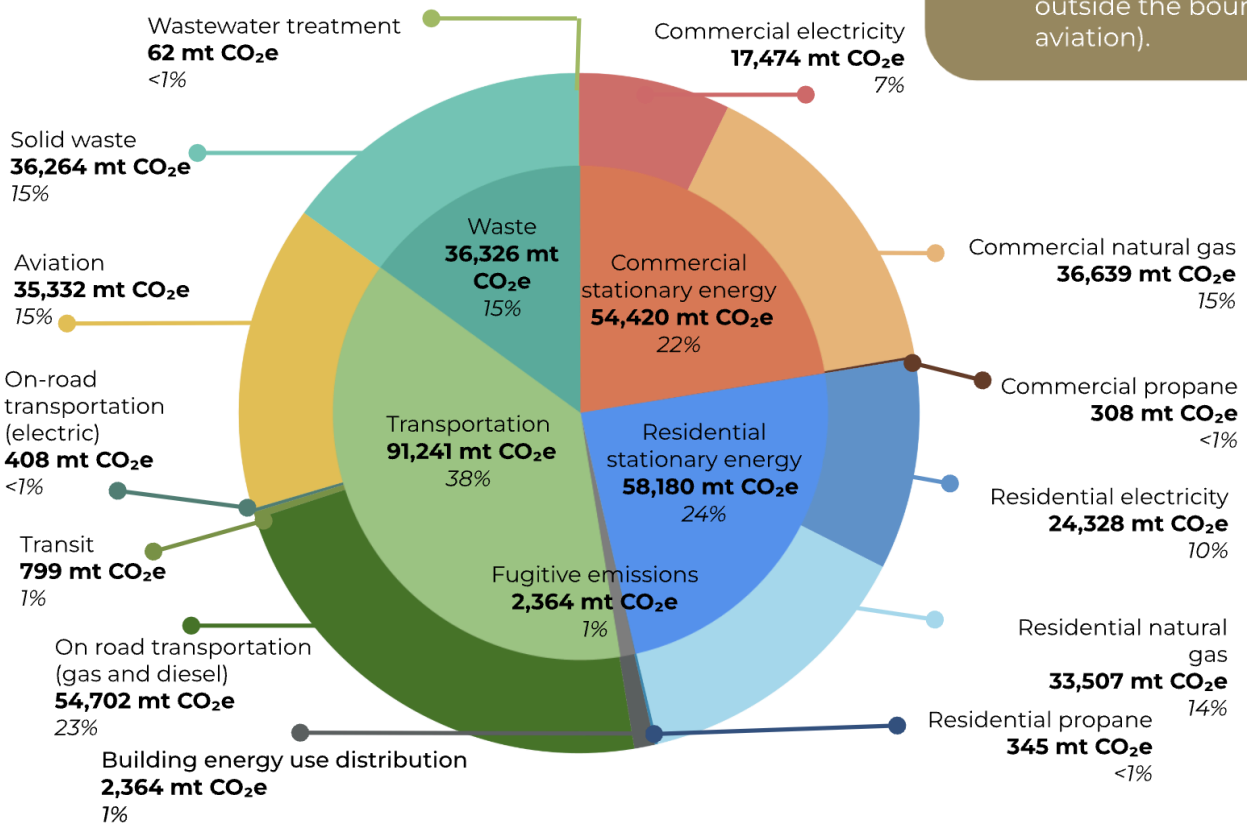
These changes have resulted in higher total emissions estimates, making “like for like” comparisons between 2019-20 and 2023 figures difficult. However, it is important to note that these methodological improvements enhance the reliability of emissions estimates across sectors, supporting more effective analysis and planning going forward.

## Overview

In accordance with the GPC, emissions are classified by sector (residential and commercial stationary energy use, transportation, and solid waste) and these sectors are further categorized by the source of emissions (electricity, natural gas, landfill, etc.). Additionally, this inventory includes aviation and wastewater treatment data.

The City of Aspen's (Aspen’s) greenhouse gas emissions (GHGs) in 2023 totaled 242,532 metric tons of carbon dioxide equivalents. This was a 23% increase over the original 2019 figure and a 30% increase over 2020. Note that if the new VMT methodology were used in 2019, it is estimated that emissions would show a smaller increase of 9% (see chart 2). When accounting for carbon removals from trees and forests, Aspen’s net emissions total 241,982 metric tons of carbon dioxide equivalents (mt $CO_2e$). The two greatest sources of emissions were natural gas use in buildings and ground transportation.

**Chart 1. Aspen emissions by sector and source, 2023**




### Direct and indirect emissions: Scope 1, 2 and 3

**Scope 1:** GHG emissions from sources located within the community’s boundary, including:

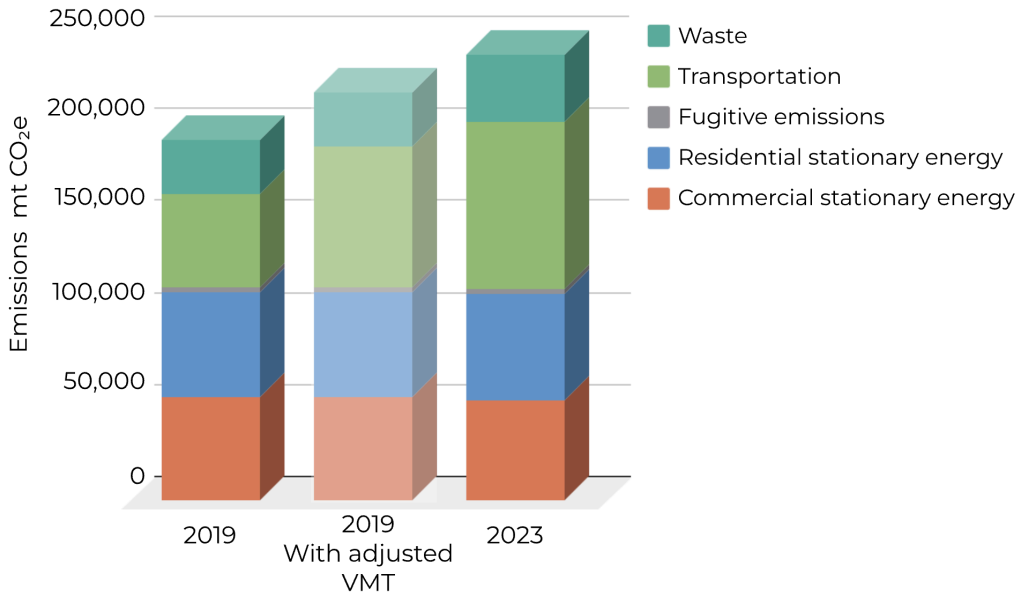
- Energy and transportation fuel combustion.
- Fugitive emissions (i.e., leakage of natural gas).
- Wastewater treated within the boundary.

**Scope 2**: Emissions occurring outside of the boundary caused by the use of grid-supplied electricity, heat, steam and/or cooling within the boundary.

**Scope 3:** Emissions that occur outside the boundary because of activities taking place within the boundary:

- Solid waste (including compost) treated outside the boundary.
- Transportation activities for which fuel combustion occurs outside the boundary (ex: aviation).

**Chart 2. Aspen emissions by sector, 2019 vs. adjusted 2019, vs. 2023**

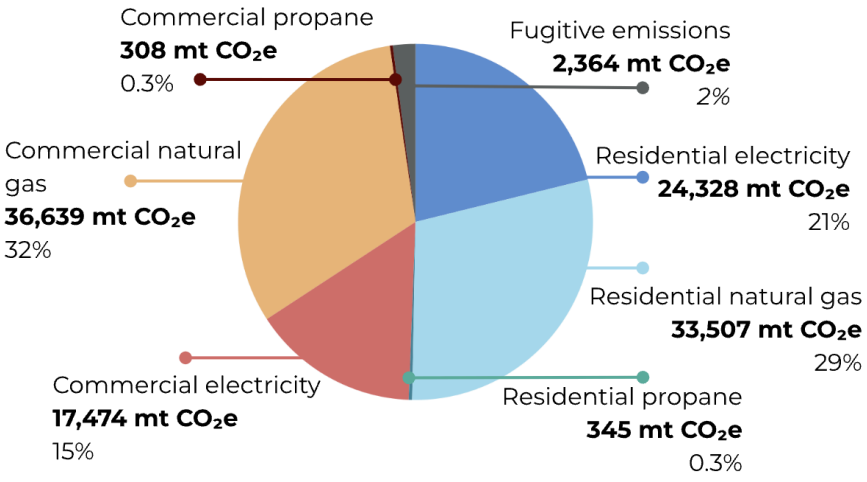



Aspen residents generated nearly 35 tons of emissions per capita in 2023. This is much higher than the state average of approximately 20 tons per capita. This is attributable mainly to second homes and lodging (which generate emissions from visitors who are not counted in the permanent population) and to the high proportion of workers who commute from outside the Region. Due to the nature of Aspen's economy, which relies on tourism and is a hub for commuters, this emissions per capita total is higher than other municipalities that would not experience emissions-intense economic activity like tourism. As such, per-capita emissions may not be relevant as a comparison to other communities, but tracking them can be instructive to show changes over time and relative to the state

## Stationary energy emissions

"Stationary energy" is the official term used in GPC inventories for energy used in buildings and facilities. In 2023, stationary energy emissions from residential and commercial buildings accounted for nearly half of all Aspen's emissions, 114,960 mt $CO_2e$ (47%).

**Chart 3. Aspen stationary energy emissions, 2023**

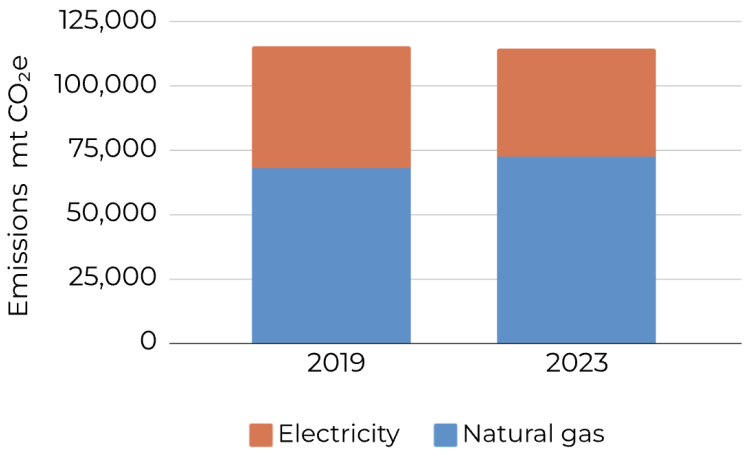



Residential buildings accounted for 50% of stationary energy emissions, while commercial buildings (which include government, industrial and multifamily housing) generated 48%. Fugitive emissions, which make up the remaining 2%, are attributed to the stationary energy sector because they are due to leaks in the distribution system that delivers natural gas to homes and buildings.

## *Contributing Trends*

In 2023, the rise in new residential construction and remodeling projects indicates increased demand for real estate development, leading to higher energy use associated with the operation of buildings. As more homes and commercial spaces are built or renovated, their energy consumption for heating, cooling, and powering appliances increases, contributing to emissions in the building sector, particularly if the energy comes from non-renewable sources. These energy demands are also reflected in the overall growth in real estate development and the regional economy.

**Chart 4. Aspen electricity and natural gas emissions, 2019 vs 2023**

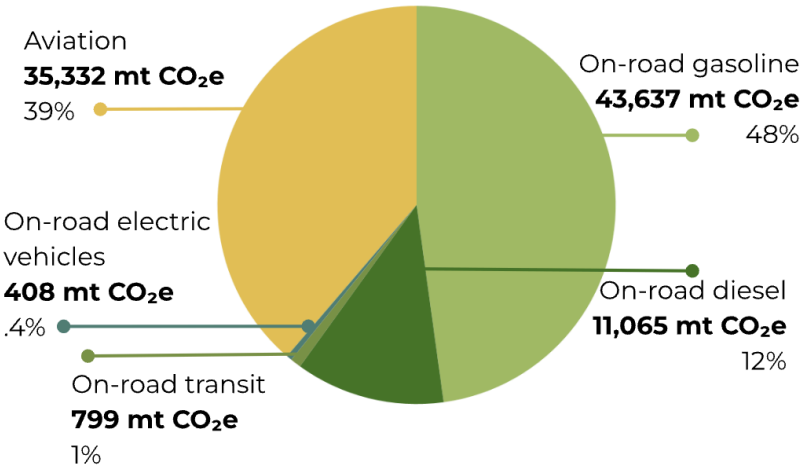



Despite usage increases in electricity and natural gas in buildings, total stationary energy emissions declined by 1% from 2019 to 2023. This is a result of electricity emissions decreasing by 11% but natural gas emissions increasing by 6%. The primary reason for the reduction is the increasing deployment of renewable energy by Holy Cross Energy.

There are opportunities to reduce emissions through continuing work on benchmarking and Building IQ and building codes as well as funding or incentive programs to encourage weatherization and electrification of homes, businesses, and government buildings.

# Transportation sector emissions

**Chart 5. Aspen transportation emissions, 2023**



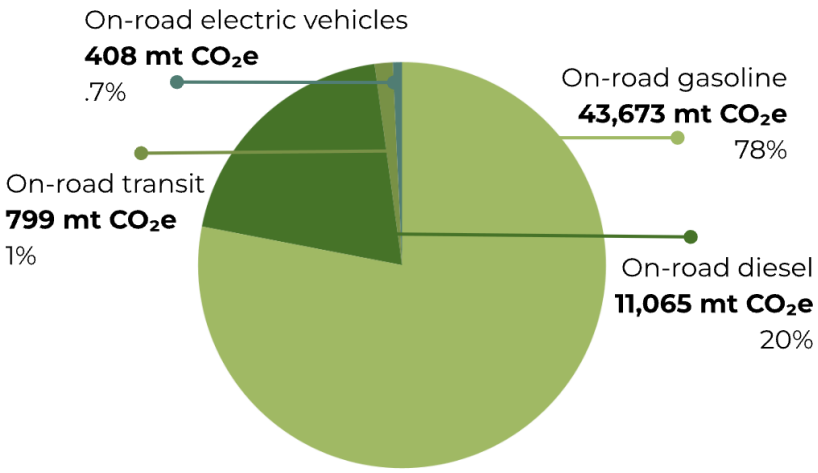

Transportation emissions in 2023 stood at 91,241 mt $CO_2e$, 38% of Aspen's total emissions. The GPC's various categories of on- and off-road transportation (i.e. ground transportation) together account for nearly two-thirds of transportation emissions. Aviation (that is, emissions from the airport, allocated to Aspen in proportion to its share of the population) produces the rest.

Considering the trends with the new methodology used for VMT emissions, transportation emissions have risen by 78% since 2019, led by a 155% increase in emissions from on-road activity. However, the latter figure does not represent a corresponding increase in vehicle travel; rather, it is primarily the result of a new methodology using higher-quality on-road transportation data to calculate vehicle miles traveled (see sidebar on next page). If the new

methodology were used in 2019, it is estimated that ground transportation emissions would show a smaller increase of 18%.

While aviation emissions regionally have increased by 22%, the aviation emissions attributed to the City of Aspen have grown 21% since 2019. Aviation emissions considered in the transportation category include aircraft emissions and airport fleet vehicles (based on fuel dispensed). In a separate report, the airport develops its own emissions inventory using an aviation-specific methodology from the National Academy of Sciences to account for all emissions associated with the operation of the airport (i.e., including buildings and ground support equipment). Additionally, the airport is developing an emission reduction action plan to facilitate alignment on climate and air quality goals with Pitkin County.

**Chart 6. Aspen transportation emissions (excluding aviation), 2023**




## Methodology update: on-road emissions

The significant increase in on-road transportation emissions in 2023 was due mainly to the updated methodology for collecting VMT (vehicle miles traveled) data.

This more accurate method allows a better understanding of travel throughout the Region. The previous method relied on cell phone location services, which have a margin of error due to many factors including personal preference for turning the service off, phone power and connectivity.

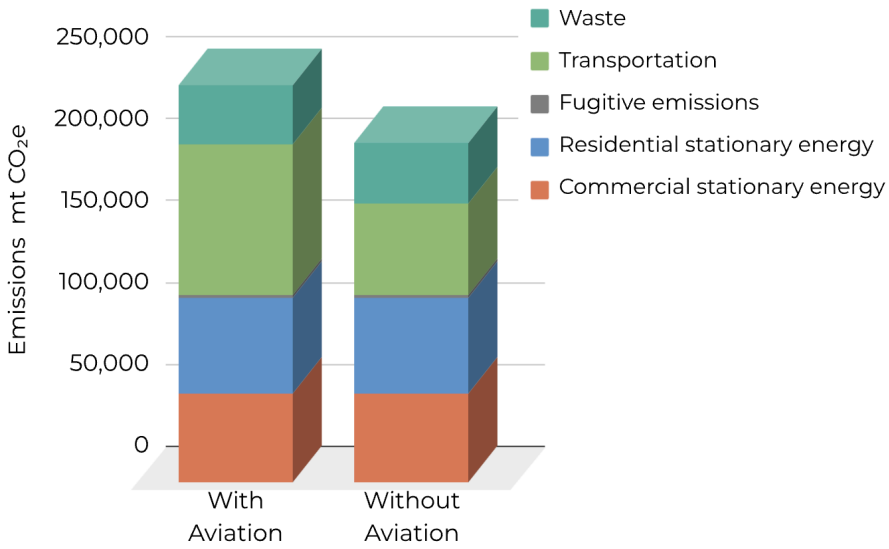
The new method utilizes a detailed analysis of on-road travel data in addition to mileage and registration data provided by the Colorado Department of Public Health and Environment.

Moving forward, the 2023 on-road emissions total of **55,909 mt $CO_2e$** will serve as a new baseline for emissions reductions due to the greater accuracy of the method.

Local communities have little control over aviation primarily due to federal regulations. To achieve the greatest impacts on transportation emissions, Aspen should focus on ground transportation. When aviation emissions are excluded (see Chart 6), on-road gasoline and diesel vehicles emerge as the source of 98% of remaining transportation emissions and the greatest opportunity for reductions. Increased electric vehicle use and mass transit options will reduce vehicle miles traveled in more polluting gasoline and diesel vehicles, thus lowering overall emissions.

When considering the emissions for Aspen without the aviation total included, emissions drop by over 40,000 mt $CO_2e$. Further reinforcing the need to focus on emissions related to ground transportation.

**Chart 7. Aspen emissions, with and without aviation, 2023**



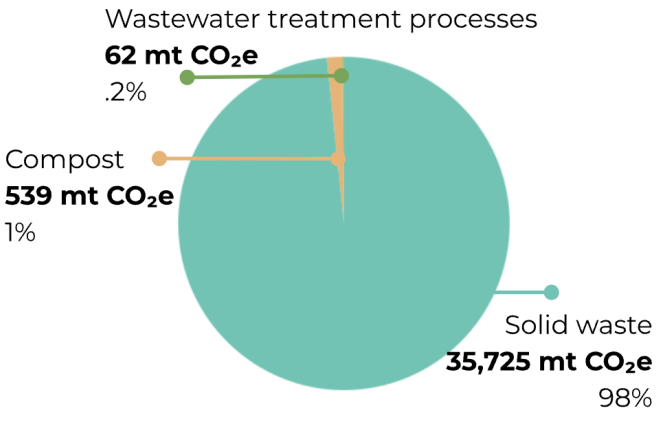

## *Contributing Trends*

In the transportation sector, the growth in tourism, as reflected by rising lodging tax revenue, rental car usage, and departing flights, suggests increased emissions from air travel and car rentals. The higher volume of traffic counts and non-scheduled flights further indicates a reliance on transportation modes that contribute to Scope 2 and Scope 3 emissions. However, the increase in RFTA ridership, especially for bus rapid transit (BRT), signals a shift toward more sustainable transportation options. This growth in travel activity may also influence the building sector by driving demand for more accommodation and related infrastructure, which could lead to greater energy consumption and associated emissions. The increased use of private vehicles can also amplify transportation emissions in the region.

A positive trend has been the adoption of electric vehicles, with battery-electric and plug-in hybrid vehicles increasing from 1% of registered vehicles in Aspen in 2019 to 3% in 2023. As the expansion of public transit use and EV adoption increases, emissions from internal combustion engine vehicles will decrease. This shows that supporting expansion in these areas needs to be a priority focus to reduce transportation emissions.

# Waste sector emissions

**Chart 8. Aspen waste emissions, 2023**




The waste sector accounted for 36,326 mt $CO_2e$ (15%) of the City's total emissions in 2023. Almost all (98%) of those emissions came from community-generated solid (i.e., landfilled) waste, with the majority due to methane produced by decomposing organic material. Composting operations and wastewater treatment processes contribute only a small proportion of waste emissions.

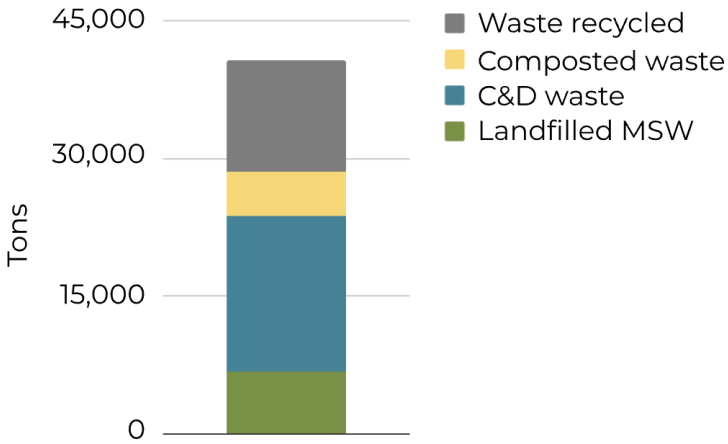
Solid waste emissions are allocated to communities based on the total residential and commercial accounts within the boundary. Emissions from waste have increased by 24% since 2019. While the growth in composted material resulted in a corresponding growth in compost emissions, the total is lower than if the same amount of waste were to go into the landfill.

During the same period, wastewater treatment process emissions declined by 3%. This change may be attributed to a number of residential properties transitioning from septic tank service to community sewer systems, which are much more efficient at reducing methane emissions.

### *Contributing Trends*

Aspen's diversion rate of waste sent to the county landfill stood at 42% in 2023, which is 8% higher than the State of Colorado's municipal solid waste (MSW) diversion rate of 34%[1]. These totals include construction and demolition (C&D) waste in addition to general MSW for residential and commercial customers.

**Chart 9. Aspen waste diversion, 2023**




Despite the growth in tourism and construction activity in 2023, levels of construction and demolition (C&D) waste and municipal solid waste (MSW) have remained relatively steady. This stability suggests that waste management systems are effectively handling the increased demand, achieved through improved recycling and waste diversion practices employed by the City.

The City has set goals to reduce organic material going into the landfill 25% by 2025 and 100% by 2050; reduce C&D waste sent to the landfill 50% by 2030 and 80% by 2050; and divert 70% of all solid waste from the landfill by 2050. Recent efforts to reduce waste sector emissions through city ordinance changes requiring organics and C&D diversion will be reflected in future inventories. The city should continue to focus on reducing overall waste creation, reducing organic waste (landscaping and food waste), and increasing the diversion of other recyclables.

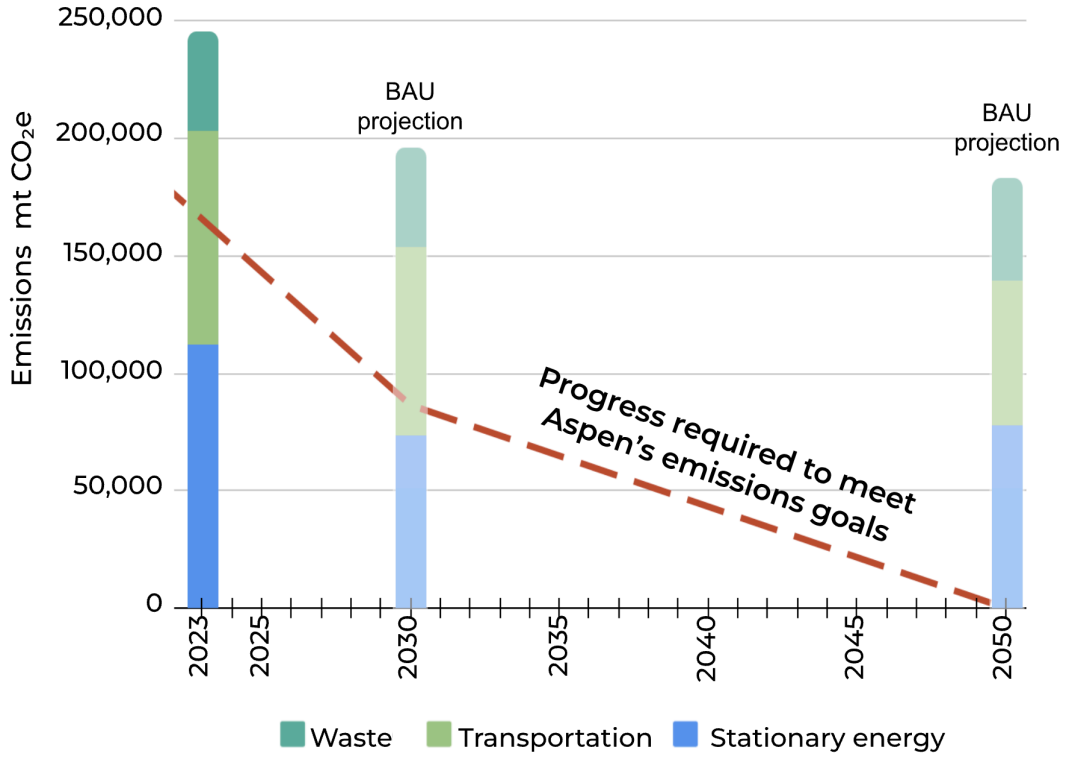
## Progress toward goals

The chart below shows the business-as-usual (BAU) emissions forecasts (i.e., the most likely emissions if no further action is taken) in 2030 and 2050, compared to the trajectory required to meet the City's goals for those years.

In the BAU scenarios, the City would see a 17% reduction in emissions by 2030 over 2017, and only a 23% reduction by 2050. These projections reflect the greening of grid-supplied electricity (cutting building emissions by 30% from 2017 to 2050) and the transition to EVs (which is projected to increase emissions by 22% in the same period), these changes are offset by anticipated population and economic growth and do not take the new VMT methodology in consideration.

[1] The State of Colorado shares two diversion rates, 16% for MSW, and 34% for total waste. The total waste diversion rate is compared here due to the inclusion of C&D waste

**Chart 10. Business-as-usual (BAU) emissions forecasts vs. long-term goals for Aspen**




This projection underscores the need for active participation by the entire Region to reach the fast-approaching 2030 goal and the even more ambitious 2050 goal. Increasing the rate of implementation and intensity of emissions reduction strategies and policies, particularly those outlined in Aspen's Sustainability Action Plan, will be imperative, especially when considering the 2050 net-zero goals set by Aspen and Snowmass.

## Conclusion

Despite progress, including a reduction in electricity-related emissions, the city's overall emissions trajectory indicates that it is unlikely to meet its ambitious climate goals without significant additional efforts. Aspen's climate strategy underscores the importance of focusing on its highest-emitting sectors to achieve meaningful reductions. Expanding programs to improve building energy efficiency, promote sustainable transportation options, and manage waste more effectively will be crucial. While Aspen has made strides, the findings make clear that more robust and urgent action is required to align with the City's long-term environmental commitments.

**An interactive version of the data in this report can be found here: https://www.aspencore.org/emissions-inventory**